

in certain significant germinal factors. Thus if *A* is sterile with *B* and *C*, *B* will be sterile with *C*. Shifting now⁸ to the physiological technique, they discover that sterility is tied up with the rate of pollen-tube growth. In cases of selfing or cross-sterile pollinations, the pollen not only germinates successfully but develops a normal pollen tube. This tube grows through the style at a uniform rate, but fails to reach its goal before the flower decays. In cases of cross-fertility the pollen tube grows at a progressively increasing rate. The logical conclusion is that self-sterility is not due to the presence of inhibiting substances, but rather to the absence of accelerating substances (catalyzers produced by the pollen-tube nucleus in compatible crosses, and only local in their effect). At the wane of the flowering period self-sterility and cross-sterility may be replaced by "pseudo-fertility." This is explained by the breaking down of the stylar tissue, so that own pollen tubes grow at a uniformly greater (not accelerated) rate.—MERLE C. COULTER.

Photometry.—The probability that a solution of uranium acetate and oxalic acid may be used successfully as a chemical photometer in physiological researches involving the measurement and comparison of light intensities is indicated by some experiments by RIDGWAY.⁹ The solution used consisted of 1 per cent uranium acetate and 5 per cent oxalic acid in aqueous solution mixed in the proportion of 1:4. In various tests designed to compare the oxalic-acid-uranium-salt photometer with the Callendar pyrheliometer, the chemical photometer gave results in general agreement with the pyrheliometer, even though the 2 instruments involve different portions of the solar spectrum. If the instrument and methods of using the solution can be reliably standardized, the inexpensiveness of the materials, ease of taking readings, accuracy of determinations, and its automatic integration for variable conditions of light during exposure will make it an excellent instrument for extending our knowledge of the influence of light as related to life processes in plants and animals.—C. A. SHULL.

Nitrogen fixation.—Another contribution from the Missouri Botanical Gardens on the subject of nitrogen fixation by lower organisms deals with the growth of *Azotobacter* in synthetic media. ALLEN¹⁰ believes that most of the discrepancies in the results of previous investigators can be explained on the basis of the phosphorus requirements of the organism and the reaction of the medium. He proves this in a fairly satisfactory way by means of the following factors: (1) when CaCO_3 is used to maintain a proper P_H in the media, the

⁸ EAST, E. M., and PARK, J. B., Studies on self-sterile plants. II. Pollen-tube growth. *Genetics* 3:353-366. figs. 3. 1918.

⁹ RIDGWAY, CHARLES S., A promising chemical photometer for plant physiological research. *Plant World* 21:234-240. 1918.

¹⁰ ALLEN, E. R., Some conditions affecting the growth and activities of *Azotobacter chroococcum*. *Ann. Mo. Bot. Gard.* 6:1-44. 1919.

phosphates are precipitated out quantitatively, and scant growth occurs; (2) when glycerol phosphate is used, the phosphorus stays in solution and better growth results; (3) the use of protective colloids (agar and potassium silicate) to prevent precipitation is accompanied by beneficial results; (4) mechanical agitation of the cultures greatly improves the growth by hastening the solution of CaCO_3 , and thus maintaining the proper reaction. In the course of the work an all-glass apparatus for the determination of nitrogen was devised.¹¹—J. J. WILLAMAN.

Distribution of dissolved oxalates in phanerogams.—MOLISCH¹² finds dissolved oxalates appearing rather generally distributed in phanerogams. All investigated species of the following families bear much dissolved oxalate: Polygonaceae, Chenopodiaceae, Amarantaceae, Aizoaceae, Begoniaceae, Melastomaceae, Oxalidaceae, Cannaceae, and Marantaceae. While in most cases this chemical character, like many other chemical characters, runs by families, this is not always the case. In certain families some genera are very rich in dissolved oxalates, while other genera contain little or none; this is true of Commelinaceae and Cactaceae.—WM. CROCKER.

Water movements in plants.—RENNER¹³ answers NORDHAUSEN's criticism (Ber. 1916) of his earlier work (Flora, 1911) on water movement in plants, and gives a number of experiments to confirm, in the main, his earlier generalizations. He also gives a brief statement on the "saturation deficit" and the "energetics of water movement" in plants.—WM. CROCKER.

Turgor and osmotic pressure.—THODAY¹⁴ gives a simple elementary analysis of turgor, osmotic pressure, and saturation deficit relations of plant cells and the conditions that lead to the movement of water from cell to cell in the plant. The article ought to do much to clear up the confusion in reference to this field.—WM. CROCKER.

Hydnaceae of North Carolina.—COKER¹⁵ has published a monograph of the Hydnaceae of North Carolina, illustrated by numerous excellent photographic plates. Six genera are presented, represented by 29 species, 2 new species being described in *Hydnellum* and 1 in *Phellodon*.—J. M. C.

¹¹ ALLEN, E. R., and DAVISSON, B. S. An all-glass nitrogen apparatus. Ann. Mo. Bot. Gard. 6:45-48. 1919.

¹² MOLISCH, HANS, Über den Microchemischen Nachweis und die Verbreitung gelöster Oxalate im Pflanzenreiche. Festschrift zum ERNST STAHL. pp. 60-70. Jena. 1918.

¹³ RENNER, O., Versuche zur Mechanik der Wasserversorgung. Ber. Deutsch. Bot. Gesells. 36:172-179. 1918.

¹⁴ THODAY, D., On turgescence and the absorption of water by the cells of plants. New Phytol. 17:108-113. 1918.

¹⁵ COKER, W. C., The Hydnums of North Carolina. Jour. Elisha Mitchell Sci. Soc. 34:163-197. pls. 29. 1919.